

REMARKS

Claims 1-22 are pending in the present application. Claims 9-22 have been added. Claims 1 and 6 are independent. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Claim 1 has been amended to reflect that the final semiconductor laser device has a spacer layer that is not undoped. Although a spacer layer is originally deposited as an undoped layer, impurities are diffused from the cladding layer into the undoped spacer layer during the device fabrication process (see page 5, lines 15-20).

Preferred Embodiment

The present application, in one preferred embodiment, is directed to a semiconductor laser device, and including at least: lower cladding layer 3; quantum well active layer 5; undoped optical guide layer 6; undoped spacer layer 7; and upper cladding layer 8. An improved feature over a conventional semiconductor laser device as shown in Figure 7, for example, is the undoped spacer layer between the upper cladding layer 8 and the undoped optical guide layer 6. This feature is present in all three disclosed embodiments. (First embodiment, in Figure 1, element 7; second embodiment, in Figure 5, element 507; and third embodiment, in Figure 6, element 607).

Claim Rejections

Claims 1-8 have been rejected under 35 U.S.C. §102(b) as being anticipated by

Tomita (U.S. Patent 5,351,254). This rejection is respectfully traversed.

Tomita

Tomita is directed to a semiconductor laser. As can be seen in Figure 1, Tomita discloses semiconductor layers as follows:

Substrate 11; Buffer layer 12; cladding layer 13; lower guide layer 14; multi-quantum well 15 made up of sub layers 151 152 and 153. Upper guide layer 16; cladding layer 17 and contact layer 18. (see column 2, lines 20-53).

Claims 1 and 6

Claim 1 is directed to a semiconductor laser device. Applicants respectfully suggest that Tomita fails to teach or suggest at least wherein an undoped spacer layer is provided between said optical guide layer and said at least one of the cladding layers.

The Examiner alleges that the undoped spacer layer is met by elements 14 and 16, in Figure 1 of the Tomita reference. However, elements 14 and 16 are not undoped spacing layers but, as mentioned above, are actually optical guide layers, comparable with the optical guide layers 4 and 6 in Figure 1 of the present application. What the Examiner alleges as being an optical guide layer, Tomita actually discloses as a part of multi-quantum well 15. In carefully reviewing the Tomita reference, we have found nowhere where it discloses an undoped spacer layer provided between an optical guide layer and at least one cladding layer. Accordingly, claim 1 for at least the above reasons, is not anticipated by the Tomita reference.

For the reason that Tomita does not disclose an undoped spacer layer as expressed above, Applicants submit that Tomita also fails to teach or suggest at least the claim limitation of claim 6 of "forming an undoped spacer layer between said second undoped optical guide layer and said p-type doped cladding layer." Accordingly, withdrawal of the rejection regarding each of independent claims 1 and 6 is respectfully requested.

Claims 2-5 and 7-8

Claims 2-5, 7 and 8 are not anticipated by Tomita at least for the reasons above for claims 1 and 6. Further, each of the dependent claims 2-5, 7 and 8 are directed to specific thicknesses, ranges, etc. none of which are disclosed in Tomita. This is especially true since Tomita does not disclose an undoped spacer layer and claims 2, 4, 5, 7 and 8 are directed to further limitations on that layer. Accordingly, at least for these reasons, withdrawal of the Examiner's rejection is respectfully requested.

Claims 9-22

Claims 9-22 have been added. These claims recite further features of the disclosed invention. For the same reasons as in the above in claims 1-8, new claims 9-22 are also not anticipated by Tomita.

Conclusion

The Examiner is respectfully requested to reconsider and withdraw the corresponding rejections of claims 1-8 at least for the above reasons and to allow all of the now pending claims 1-22.

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

In the event there are any outstanding matters remaining in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Marked-up copy of Claim 1

1. (Amended) A semiconductor laser device having a quantum well active layer disposed between a pair of cladding layers, and an optical guide layer disposed between at least one of the cladding layers and the quantum well active layer,
wherein a [an undoped] spacer layer is provided between said optical guide layer and said at least one of the cladding layers.